

PATENT ABSTRACTS OF JAPAN

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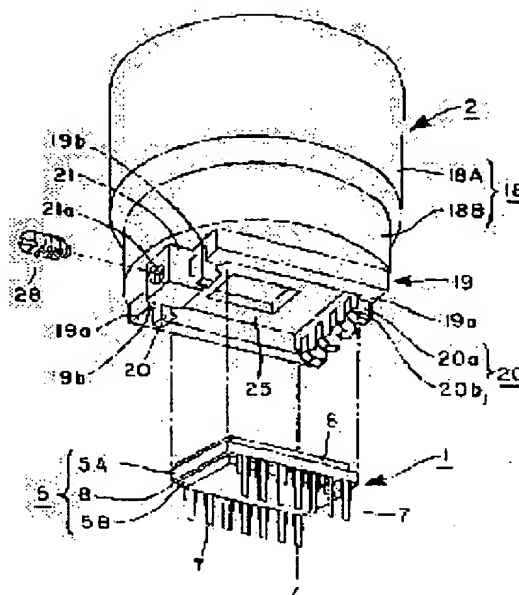
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(54) ELECTRONIC IMAGE PICKUP DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To realize an electronic image pickup device capable of realizing the high density and the miniaturization of a base plate and being made excellent in mounting performance.

SOLUTION: In this electronic image pickup device, a solid-state image pickup element 1 and a lens assembly 2 incorporating a lens system in a cylindrical mount 18 are coaxially disposed so that the element 1 is positioned inside the assembly 2 for a wiring board 3. By providing a locking part 8 on the outer periphery of a case 5 of the element 1 and forming a pawl part 20 on the corresponding rear end side of the mount 18, the assembly 2 is attached to the element 1 through the engagement of the locking part 8 and the pawl part 20.



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CLAIMS

[Claim(s)]

[Claim 1] Electronic image pick-up equipment characterized by what a claw part is both formed in a correspondence back end side of said mounting as it is characterized by providing the following, and said lens assembly is attached for through engagement to said stop section and said claw part to said solid state image sensor A solid state image sensor with a case A lens assembly which incorporated a lens system in tubed mounting sets to electronic image pick-up equipment which is located inside said lens assembly in said solid state image sensor, and is arranged in the same axle to a wiring substrate, and it is the stop section to a case periphery of said solid state image sensor.

[Claim 2] Electronic image pick-up equipment according to claim 1 arranged with a crevice between said wiring substrates in the condition of having engaged with the stop section while snap engagement of said claw part is carried out to the stop section of the shape of a level difference which protruded on a back end side of said mounting, and was prepared in a periphery of said case.

[Claim 3] Electronic image pick-up equipment given in any of claims 1-3 they are which will be in said engagement condition by having a frame-like attaching part by which said mounting was prepared in the back end section, forming said claw part in a board portion which this attaching part counters, respectively, and pushing said solid state image sensor relatively to said attaching part.

[Claim 4] Electronic image pick-up equipment according to claim 3 whose stop of a solid state image sensor into which it was put in said attaching part with a screw which prepares a screw hole of the direction of a path in a board portion which forms said attaching part, and is inserted from this screw hole is enabled.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] Especially this invention relates to the electronic image pick-up equipment which used the solid state image sensor among picture input devices.

[0002]

[Description of the Prior Art] Electronic image pick-up equipment is transformed to an electrical signal with a solid state image sensor, and is transmitted to control sections, such as an image processing, while it carries out image formation of the photographic subject to the light sensing portion of solid state image sensors, such as CCD (charge-coupled device), through a lens system as indicated by JP,9-203838,A etc. Drawing 5 shows the conventional outline configuration, and where the image pick-up section is attached in a wiring substrate, it shows it. The solid state image sensor 51 of drawing 5 is carrying out the internal organs of photo-electric-conversion section 51a which is a light sensing portion, the charge storage section, the transfer section, etc. to the case 52 which carried out the front opening. Moreover, the front opening of a case 52 is equipped with the protective cover 53 of transparency, and it has the terminal 54 of a large number which protruded back on both sides of a case 52. And a solid state image sensor 51 is attached by projecting and soldering each terminal 54 to a rear face from the substrate surface through a through tube to the wiring substrate 50. The lens assembly 61 is held in the tubed mounting 69 while each lenses 62, 63, and 64 are attached in a lens-barrel 68 using lens holders 65 and 66 and 67 grades. And the lens assembly 61 is attached in a substrate side with two or more screws 70 from a rear-face side while it is arranged on the wiring substrate 50 so that the tubed mounting 69 may cover a solid state image sensor 51.

[0003] With this structure, image formation of the photographic subject is carried out in the lens system of the lens assembly 61 on the image pick-up side of through photo-electric-conversion section 51a, and this continues photo electric conversion and a charge storage, and is outputted to a substrate side control section as an electrical signal through a terminal 54 from the charge storage section and the transfer section. In addition, the small thing of [solid state image sensor / 51] 1/3 inch in the size of an image pick-up side is also used, and the miniaturization is attained also for the lens assembly 61 in connection with it.

[0004]

[Problem(s) to be Solved by the Invention] However, if it was in the conventional electronic image pick-up equipment mentioned above, there were the following problems. Only the number according to the screw

70 is formed for screw hole 50a in the wiring substrate 50 by the relation in which the lens assembly 61 is attached in the 1st through two or more screws 70 at a substrate side. For this reason, the circuit wiring prepared in a substrate table rear face must avoid a screw hole 50, and when attaining the densification of a substrate, and a miniaturization, it is a neck. It develops into this fault having to add attachment section 69a of path size to a back end side, having to carry out close arrangement of the back end side and attachment section 39a like drawing 5, at the wiring substrate 50, and being unable to use the portion on the surface of a substrate corresponding to it as the wiring circuit section, either, if mounting 69 becomes small the 2nd. Screwing actuation of each screw 70 must be carried out from a substrate rear face side in the condition of having arranged the lens assembly 61 on the surface of the wiring substrate 50 by attachment to the 3rd. For this reason, the positioning device section became complicated and lacked in attachment nature.

[0005] The purpose of this invention is to offer electronic image pick-up equipment excellent in attachment nature while it solves the above problem and enables densification and the miniaturization of a substrate. Furthermore, in the contents explained below, one by one, other purposes are explained and go.

[0006]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, a solid state image sensor with a case and a lens assembly which incorporated a lens system in tubed mounting this invention In electronic image pick-up equipment which is located inside said lens assembly in said solid state image sensor to a wiring substrate, and is arranged in the same axle, while preparing the stop section in a case periphery of said solid state image sensor A claw part is formed in a correspondence back end side of said mounting, and said lens assembly is attached through engagement to said stop section and said claw part to said solid state image sensor. Said claw part protrudes on the back end section of said mounting in the shape of [with a pawl] a piece (piece with a tip pawl), and snap engagement is carried out to the stop section of the shape of a level difference prepared in a periphery of said case, for example.

[0007] According to this configuration, a lens assembly is attached to a solid state image sensor. Therefore, with this configuration, since it becomes unnecessary to prepare a screw hole of dedication in a wiring substrate side like the former, it makes it possible to lose constraint of circuit wiring conventionally prepared in a substrate table rear face to structure, and to attain densification of a substrate, and a miniaturization. Even if it is after attaching a solid state image sensor in coincidence to a wiring substrate in addition to the ability to perform installation of a lens assembly regardless of a wiring substrate, since it can carry out from a surface side of a wiring substrate, workability becomes good and it also becomes possible to simplify a positioning device etc. sharply.

[0008] As for the above this invention, it is more desirable that shape is taken as follows. While snap engagement is carried out to the level difference-like stop section by which said claw part protruded on a back end side of said mounting, and was prepared in the 1st at a case periphery of a solid state image sensor, it is the structure arranged with a crevice between said wiring substrates in the condition of having engaged with the stop section. What is necessary is just to change some configurations of said case with this configuration as the stop section by the side of a solid state image sensor. Moreover, since a lens assembly has a crevice and is arranged, a surface side of a wiring substrate makes available effectively a substrate portion equivalent to the attachment section by the side of a lens assembly as the wiring circuit.

section like the former that what is necessary is to secure only area according to a clamp face of a solid state image sensor. It is the structure which will be in said engagement condition by having a frame-like attaching part by which said mounting was prepared in the back end section, forming said claw part in a board portion which this attaching part counters, respectively, and pushing said solid state image sensor on the 2nd relatively to said attaching part. With this configuration, since it is attached by engagement to the stop section and a claw part at the same time a solid state image sensor is pushed on an attaching part to a lens assembly, engagement becomes not carelessly canceled easily by frame-like attaching part, and stability in an attachment condition is guaranteed. It is the structure whose stop of a solid state image sensor into which it was put in said attaching part with a screw which prepares a screwhole of the direction of a path in a board portion which forms said attaching part, and is inserted in the 3rd from this screwhole is enabled. This screw stop is not indispensable and is added to engagement structure described above in order to plan reliability. Thus, one piece is enough as a screw added to engagement structure, and it can apply, without spoiling a miniaturization of a wiring substrate described above from a screw stop being carried out in the direction of a path of an attaching part.

[0009]

[Embodiment of the Invention] Hereafter, drawing 4 explains the operation gestalt of this invention from drawing 1. In addition, this example of a gestalt is a suitable example of this invention, and does not restrain the range of this invention.

[0010] Drawing 1 is the outline exploded view showing the relation of the lens assembly of electronic photography equipment and solid state image sensor which applied this invention, drawing 2 (a) shows the A-A line cross section of drawing 3, drawing 2 (b) shows the B-B line cross section of drawing 3, and drawing 3 is drawing seen from the back side about the electronic image pick-up equipment which applied this invention where a lens assembly and a solid state image sensor are attached. In drawing, although a solid state image sensor 1 and the lens assemblies 2, such as CCD, are located inside the lens assembly 2 in a solid state image sensor 1 to the wiring substrate 3 and it is arranged in the same axle, as for electronic image pick-up equipment, the device is given to the attachment structure of the lens assembly 2 in that case. In addition, the wiring substrate 3 forms a circuit in the table rear face of a non-conductive board by printing etc. like the conventional substrate of drawing 5, and attaches various kinds of chips. however, the lens assembly of the former [substrate / 3 / this / wiring] the mounting hole of the body and its function is omitted.

[0010] The point which is carrying out the internal organs of the photo-electric conversion section 4 and the charge storage section whose solid state image sensor 1 is the light sensing portion which arranged many pixels by high density here, the transfer section, etc. to the case 5 which carried out the front opening. It is made the same with the former at the point which projects a terminal 7 in the front face of a case 5 from a through tube to a rear-face side to the wiring substrate 3 like the point and drawing 5 which have the terminal 7 of a large number which protruded to back from the point of having equipped with the protective cover 6 of transparency, and the both-sides wall of a case 5, and is attached in it by soldering. A different configuration is a configuration setup of a case 5, and after flank part 5B is small formed a little to before flank part 5A. Thereby, the case 5 has the stop section 8 of the shape of a level difference which made the back side low among both the portions 5A and 5B. This stop section 8 is formed on a level difference with a width of face of about 1mm and the inclination side of partial 5B located inside that level difference. And in the case 5 of an abbreviation rectangle. the stop section 8 of the part where a

terminal 7 is not arranged among each flank which counters is used.

[0011] On the other hand, as for the lens assembly 2, the lens system consists of lenses 10, 11, and 12 of three sheets, and a filter 13 of one sheet. Each lenses 10, 11, and 12 are attached in the lens-barrel 17 using electrode holders 14 and 15 and 16 grades. A filter 13 is the Xtal birefringent plate and is attached in the tubed mounting 18. Although this basic structure is the same as usual almost, mounting 18 differs from elegance greatly conventionally. Namely, before side 18A has the attaching part 19 of the shape of a frame which protruded on **** with formation ***** rather than backside 18B at the end face of backside 18B, and, as for this mounting 18, a claw part 20 and screwhole 21a are formed to that attaching part 19.

[0012] Before side 18A is equipped with the lens-barrel 17 which attached lenses 10, 11, and 12 through the female screw 22 of inner circumference, and the male screw 23 of a lens-barrel periphery. After leading to the front through tube 24 and a through tube 24, the near through tube 25 is formed in the interior of backside 18B. In the shape of a rectangle, nothing and a through tube 24 are larger than a through tube 25, and both the through tubes 24 and 25 are formed by each. Moreover, the through tube 24 has the notch which arranges the member 26 which presses down the filter 13 of the rectangle arranged here. And a filter 13 is fixed in a through tube 24 by being pushed against an one direction through the member 26 and screw 27 in said notch.

[0013] An attaching part 19 is in the end face of backside 18B, focusing on the through tube 25, projects in the shape of [rectangular] a frame, and is formed. The magnitude in an attaching part 19 is almost equal to the outer diameter of a solid state image sensor 2, and it is set up so that after [a case 5] flank part 5B may jut out a solid state image sensor 2 outside in the condition of having arranged inside, as the depth shows drawing 2 (b). Two or more claw parts 20 are formed in 1 set of board portions 19a and 19a at one among the board portions of the shape of a frame which forms the attaching part 19. Four claw parts 20 are formed in one board partial 19a at abbreviation regular intervals. Two claw parts 20 are formed, both this claw part 20 does, and while the swelling section 21 is formed in the condition of having *****ed outside, screwhole 21a penetrated in the direction of a path is formed in that swelling section 26 at board partial 19a of another side. Each claw part 20 forms pawl 20b of the inner sense at a projection and its tip for piece 20a back from the end face of an attaching part 19. moreover, elastic displacement is possible for each claw part 20 by preparing slit 19b to the board portions 19a and 19a corresponding to each piece 20a -- that is, snap engagement is carried out.

[0014] the above lens assembly 2 and solid state image sensor 1 -- a solid state image sensor 1 -- an attaching part 19 -- receiving -- the elasticity of a claw part 20 -- it is attached by being pushed in with displacement. In the state of this attachment, as shown in drawing 2 (a), each claw part 20 engages with the stop section 8 of the shape of a level difference of a case 5, and a stop is escaped and carried out by the strength according to that engagement force. Each claw part 20 is attained to the abbreviation mid-position of after [a case 5] flank part 5B. and a predetermined crevice is secured between the clamp faces 3 of after flank part 5B (rear face). i.e., a wiring substrate. Moreover, with this gestalt. in order to prevent an unprepared blank, the solid state image sensor 1 held in the attaching part 19 falls out, and the stop is made to be carried out also with that screw 28 by thrusting a screw 28 into screwhole 21a. However, this screw stop is not indispensable. and the bottom is also good [a stop] so that the strictly auxiliary fixed force is acquired and it replaces with a screw 28, for example, adhesives may be poured between an attaching part 19 and a case 5 and it may join to it.

[0015] With the electronic image pick-up equipment constituted as mentioned above, image formation of the photographic subject is carried out through each lens objects 10, 11, and 12 and a filter 13 on the image pick-up side of the photo-electric-conversion section 4 by the side of a solid state image sensor 1, and this continues photo electric conversion and a charge storage, and is outputted to a substrate side wiring circuit as an electrical signal through a terminal 7 from the charge storage section and the transfer section. Although this point is the same as the former, it becomes unnecessary to prepare the screw hole for lens assembly 2 in the wiring substrate 3 side with this configuration. This originates in said screw hole being conventionally omissible to structure in this electronic image pick-up equipment, and constraint of the circuit wiring prepared in a substrate table rear face can be lost, consequently densification and a miniaturization are attained comparatively easily from that of a substrate configuration. Moreover, even if it is after installation of the lens assembly 2 attaches a solid state image sensor 2 to the wiring substrate 3 since it is made to a solid state image sensor 2 and can be performed regardless of the wiring substrate 3 for example, since it can carry out from the surface side of the wiring substrate 3, it can improve working efficiency.

[0016] Drawing 4 shows the electronic photography equipment which transformed said example of a gestalt in the same cross section as drawing 2 (a). In the electronic image pick-up equipment of this drawing, the explanation which gave the same sign to the same part as drawing 3, and overlapped it from drawing 1 is omitted, and only a different configuration is explained in full detail. The electronic image pick-up equipment of drawing 4 is an example of a configuration in case the lens assembly 2 is the single lens 30, and the attaching part 19 with side 18B and claw part 20 and solid state image sensor 1 the very thing make it the same substantially with the above-mentioned example of a gestalt after mounting 18. Namely, as for this lens assembly 2, the lens 30 is attached in the lens-barrel 37 using the electrode-holder 31 grade. In this case, the lens-barrel 37 has concave section 37a prepared inside. And the lens 30 is a configuration held through the electrode holder 31 of the shape of a ring fixed in the heat caulking section 32, after having been arranged to concave section 37a. the pickpocket for whom a sign 33 is used when a lens-barrel 37 is incorporated in before [mounting 18] side 18A -- it is a rate. Thus, except the technical element indicated to the claim, this invention can use each above-mentioned gestalt as the base, and can change it variously.

[0017]

[Effect of the Invention] If it is in the electronic image pick-up equipment of this invention as explained above, like the former, constraint of the circuit wiring which it becomes unnecessary to prepare the screw hole of dedication in a wiring substrate side, and is prepared in a substrate table rear face corresponding to it can be lost, and the densification of a substrate and a miniaturization can be attained. Moreover, since it can carry out from the surface side of a wiring substrate even if it is after being able to perform installation of a lens assembly regardless of a wiring substrate, for example, attaching a solid state image sensor to a wiring substrate, workability becomes good and can simplify a positioning device etc. sharply.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the outline perspective diagram showing the relation between a lens assembly and a solid state image sensor about the example of this invention gestalt.

[Drawing 2] It is the cross section which meets the A-A line and B-B line of drawing 3.

[Drawing 3] It is the rear view when seeing the electronic image pick-up equipment of the example of this invention gestalt from a solid state image sensor side in the state of the assembly of a lens assembly and a solid state image sensor.

[Drawing 4] It is the cross section showing other examples of electronic image pick-up equipment which applied this invention.

[Drawing 5] It is the cross section showing conventional electronic image pick-up equipment.

[Description of Notations]

For a lens assembly and 3, a wiring substrate and 5 are [1 / a solid state image sensor and 2] a case.

For the stop section and 18, mounting and 19 are [7 / a terminal and 8] an attaching part.

The opposite board portion and 19b from which 19a constitutes the frame-like attaching part are a slit.

For a claw part and 21a, a screw hole and 28 are [20] a screw.

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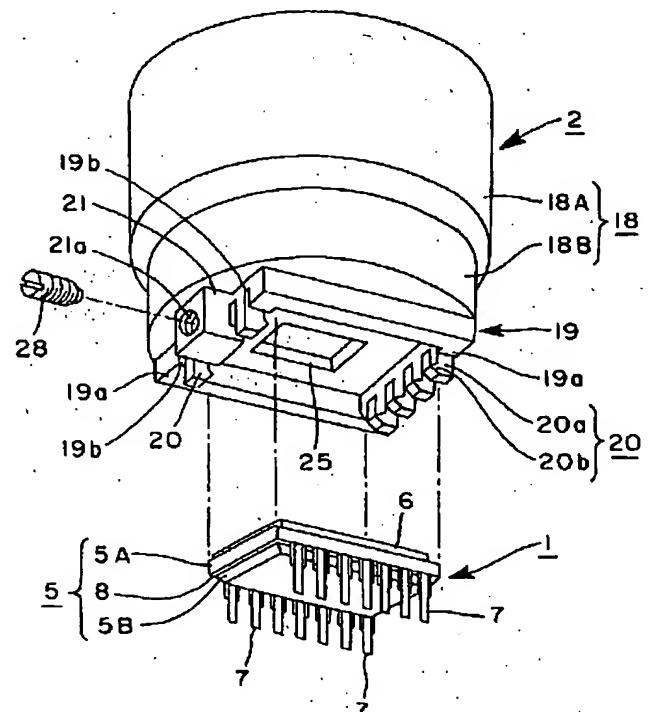
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(54) 【発明の名称】 電子撮像装置

(57) 【要約】

【課題】 高密度化及び基板の小型化をより可能にすると共に、取付性に優れた電子撮像装置を実現する。

【解決手段】 固体撮像素子1と、レンズ系を筒状マウント18内に組み込んだレンズ組立体2とが、配線基板3に対し固体撮像素子1をレンズ組立体2の内側に位置し、かつ同軸に配設される電子撮像装置において、固体撮像素子1のケース5外周に係止部8を設けると共に、マウント18の対応後端側に爪部20を形成して、レンズ組立体2を固体撮像素子1に対し係止部8と爪部20との係合を介し取り付けようにしたものである。



(2)

【特許請求の範囲】

【請求項1】 ケース付き固体撮像素子と、レンズ系を筒状マウント内に組み込んだレンズ組立体とが、配線基板に対し前記固体撮像素子を前記レンズ組立体の内側に位置し、かつ同軸に配設される電子撮像装置において、前記固体撮像素子のケース外周に係止部を設けると共に、前記マウントの対応後端側に爪部を形成して、前記レンズ組立体を前記固体撮像素子に対し前記係止部と前記爪部との係合を介し取り付け、ことを特徴とする電子撮像装置。

【請求項2】 前記爪部が、前記マウントの後端側に突設されて、前記ケースの外周に設けられた段差状の係止部に対しスナップ係合されると共に、係止部に係合した状態で前記配線基板との間に隙間を持って配置される請求項1に記載の電子撮像装置。

【請求項3】 前記マウントが後端部に設けられた枠状の保持部を有し、該保持部の対向する板部分に前記爪部をそれぞれ形成しており、前記固体撮像素子が前記保持部に対し相対的に押し入れられることにより前記係合状態になる請求項1から3の何れかに記載の電子撮像装置。

【請求項4】 前記保持部を形成している板部分に径方向のネジ孔を設け、該ネジ孔から差し込まれるネジにより前記保持部内に入れられた固体撮像素子を係止可能にしている請求項3に記載の電子撮像装置。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、画像入力装置の内、特に、固体撮像素子を用いた電子撮像装置に関するものである。

【0002】

【従来の技術】電子撮像装置は、特開平9-203838号公報等に記載されている如く被写体をレンズ系を通してCCD（電荷結合素子）等の固体撮像素子の受光部に結像させると共に、固体撮像素子で電気信号に変換させて画像処理などの制御部に転送するものである。図5はその従来の概略構成を示し、撮像部を配線基板に取り付けた状態で示している。図5の固体撮像素子51は、受光部である光電変換部51a、電荷蓄積部や転送部等を前面開口したケース52に内蔵している。また、ケース52の前面開口部には透明の保護カバー53を装着し、ケース52の両側には後方へ突設された多数の端子54を有している。そして、固体撮像素子51は、配線基板50に対し、各端子54が基板表面から裏面に貫通孔を介し突出されて半田付けされることにより取り付けられる。レンズ組立体61は、各レンズ62、63、64がレンズホルダー65、66、67等を用いて鏡筒68内に組み付けられると共に、筒状マウント69内に保持されている。そして、レンズ組立体61は、筒状マウント69が固体撮像素子51を覆うように配線基板50

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上に配置されると共に、裏面側から複数のネジ70により基板側に取り付けられる。

【0003】この構造では、被写体がレンズ組立体61のレンズ系を通し光電変換部51aの撮像面上に結像され、これが光電変換と電荷蓄積を続けて電荷蓄積部及び転送部から端子54を介して基板側制御部に電気信号として出力される。なお、固体撮像素子51は撮像面のサイズが1/3インチという小さなものも使用され、レンズ組立体61もそれに伴って小型化が図られている。

10 【0004】

【発明が解決しようとする課題】ところが、上述した従来の電子撮像装置にあっては次のような問題があった。第1に、レンズ組立体61が複数のネジ70を介し基板側に取り付けられる関係で、配線基板50にはそのネジ70に応じた数だけネジ孔50aが設けられる。このため、基板表裏面に設けられる回路配線は、ネジ孔50を避けてはならず、基板の高密度化及び小型化を図る上でネックになっている。第2に、この不具合は、マウント69が小さくなると、図5の如く後端側に径大の取付部69aを追加し、後端面及び取付部39aを配線基板50に密接配置しなくてはならず、それに対応した基板表面の部分も配線回路部として利用できないことに発展する。第3に、取付作業では、レンズ組立体61を配線基板50の表面に配置した状態で基板裏面側から各ネジ70を螺入操作しなくてはならない。このため、位置決め機構部が複雑になり、取付性に欠けていた。

【0005】本発明の目的は、以上の問題を解消して、高密度化及び基板の小型化をより可能にすると共に、取付性に優れた電子撮像装置を提供することにある。更に他の目的は、以下に説明する内容の中で順次明らかにして行く。

30 【0006】

【課題を解決するための手段】上記目的を達成するため本発明は、ケース付き固体撮像素子と、レンズ系を筒状マウント内に組み込んだレンズ組立体とが、配線基板に対し前記固体撮像素子を前記レンズ組立体の内側に位置し、かつ同軸に配設される電子撮像装置において、前記固体撮像素子のケース外周に係止部を設けると共に、前記マウントの対応後端側に爪部を形成して、前記レンズ組立体を前記固体撮像素子に対し前記係止部と前記爪部との係合を介し取り付けるようにしたものである。前記爪部は、例えば、前記マウントの後端部に爪付きの片状（先端爪付きの片）に突設されて、前記ケースの外周に設けられた段差状の係止部に対しスナップ係合される。

【0007】この構成によれば、レンズ組立体は固体撮像素子に対し取り付けられる。したがって、この構成では、従来の如く配線基板側に専用のネジ孔を設ける必要がなくなることから、従来構造に対し基板表裏面に設けられる回路配線の制約をなくして、基板の高密度化及び小型化を図ることを可能にする。同時に、レンズ組立体

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の取り付け作業は、配線基板に関係なく行えることに加え、例えば、配線基板に対し固体撮像素子を取り付けた後であっても、配線基板の表面側から行えるため作業性が良好になり、位置決め機構等を大幅に簡略化することも可能になる。

【0008】以上の本発明は次のように具体化されることがより好ましい。第1に、前記爪部が、前記マウントの後端側に突設されて、固体撮像素子のケース外周に設けられた段差状の係止部に対しスナップ係合されると共に、係止部に係合した状態で前記配線基板との間に隙間を持って配置される構造である。この構成では、固体撮像素子側の係止部として、前記ケースの形状を多少変更するだけでよい。また、配線基板の表面側は、レンズ組立体が隙間を持って配設されることから、固体撮像素子の取付面に応じた面積だけを確保すればよく、従来の如くレンズ組立体側の取付部に相当する基板部分を配線回路部として有効に利用可能にする。第2に、前記マウントが後端部に設けられた枠状の保持部を有し、該保持部の対向する板部分に前記爪部をそれぞれ形成しており、前記固体撮像素子が前記保持部に対し相対的に押し入れられることにより前記係合状態になる構造である。この構成では、固体撮像素子がレンズ組立体に対し保持部に押し入れられると同時に係止部と爪部との係合により取り付けられるため、枠状の保持部により係合が不用意に解除され難くなり、取付状態における安定性が保証される。第3に、前記保持部を形成している板部分に径方向のネジ孔を設け、該ネジ孔から差し込まれるネジにより前記保持部内に入れられた固体撮像素子を係止可能にしている構造である。このネジ止めは、不可欠ではなく、信頼性を図るために上記した係合構造に追加するものである。このように係合構造に追加されるネジは1個で充分であり、また、保持部の径方向にネジ止めされることから上記した配線基板の小型化を損ねることもなく適用できる。

【0009】

【発明の実施の形態】以下、本発明の実施形態を図1から図4により説明する。なお、この形態例は、本発明の好適な具体例であり、本発明の範囲を制約するものではない。

【0010】図1は本発明を適用した電子撮影装置のレンズ組立体と固体撮像素子との関係を示す概略分解図であり、図2(a)は図3のA-A線断面を示し、図2

(b)は図3のB-B線断面を示し、図3は本発明を適用した電子撮像装置について、レンズ組立体と固体撮像素子とを取り付けた状態で背面側から見た図である。図において、電子撮像装置は、CCD等の固体撮像素子1及びレンズ組立体2とが配線基板3に対し固体撮像素子1をレンズ組立体2の内側に位置し、かつ同軸に配設されるが、その場合にレンズ組立体2の取付構造に工夫が施されている。なお、配線基板3は、図5の従来基板と

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同様に非導電性板の表裏面に回路を印刷等により形成し、かつ各種のチップを組み付けたものである。但し、この配線基板3には従来のレンズ組立体用の取付孔が省略されている。

【0010】ここで、固体撮像素子1は、多数の画素を高密度で配列した受光部である光電変換部4、電荷蓄積部や転送部等を前面開口したケース5に内蔵している点、ケース5の前面に透明の保護カバー6を装着している点、ケース5の両側壁から後方へ突設された多数の端子7を有している点、図5と同様に配線基板3に対して端子7を貫通孔から裏面側へ突出して半田付けにより取り付けられる点で従来と同じくしている。異なる構成は、ケース5の形状設定であり、前側部分5Aに対し後側部分5Bを若干小さく形成されている。これにより、ケース5は両部分5A、5Bの間に後方側を低くした段差状の係止部8を有している。この係止部8は、約1mm程度の幅の段差と、その段差の内側に位置している部分5Bの傾斜側面とで形成されている。そして、略矩形のケース5において、対向する各側部のうち、端子7が配置されない箇所の係止部8が用いられる。

【0011】これに対し、レンズ組立体2は、レンズ系が3枚のレンズ10、11、12と1枚のフィルター13で構成されている。各レンズ10、11、12は、ホルダー14、15、16等を用いて鏡筒17内に組み付けられている。フィルター13は水晶複屈折板であり、筒状マウント18内に組み付けられている。この基本構造は従来とほぼ同様であるが、マウント18が従来品と大きく異なっている。すなわち、このマウント18は、前側18Aが後側18Bよりも径小に形成していると共に、後側18Bの端面に突設された枠状の保持部19を有し、その保持部19に対し爪部20とネジ孔21aとが形成されている。

【0012】前側18Aには、レンズ10、11、12を組み付けた鏡筒17が内周の雌ネジ22と鏡筒外周の雄ネジ23を介して装着される。後側18Bの内部には、前方の貫通孔24と、貫通孔24に通じる後側の貫通孔25とが設けられている。両貫通孔24、25は何れも矩形をなし、貫通孔24が貫通孔25よりも大きく形成されている。また、貫通孔24は、ここに配置される矩形のフィルター13を押さえる部材26を配置する切欠部を有している。そして、フィルター13は、前記切欠部内の部材26及びネジ27を介し一方に押し付けられることにより貫通孔24内に固定される。

【0013】保持部19は、後側18Bの端面にあって、貫通孔25を中心として矩形の枠状に突出形成されている。保持部19内の大きさは、固体撮像素子2の外径にほぼ等しく、深さが図2(b)に示す如く固体撮像素子2を内部に配置した状態でケース5の後側部分5Bが外へ張り出すように設定されている。保持部19を形成している枠状の板部分のうち、1組の板部分19a、

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19aには複数の爪部20が一体に設けられている。一方の板部分19aには4個の爪部20が略等間隔に設けられている。他方の板部分19aには、爪部20が2個設けられ、この両爪部20の間にあって、外側に張り出した状態で膨出部21が設けられると共に、その膨出部26に径方向に貫通したネジ孔21aが形成されている。各爪部20は、保持部19の端面から片20aを後方へ突出し、その先端に内向きの爪20bを形成したものである。また、各爪部20は、板部分19a、19aに対し各片20aに対応してスリット19bを設けることにより、弾性変位可能つまりスナップ係合されるようになっている。

【0014】以上のレンズ組立体2と固体撮像素子1とは、固体撮像素子1が保持部19に対し爪部20の弾性変位を伴って押し込められることにより取り付けられる。この取付状態では、図2(a)に示す如く各爪部20がケース5の段差状の係止部8に係合し、その係合力に応じた強さで抜け止めされる。各爪部20は、ケース5の後側部分5Bの略中間位置まで達しており、後側部分5Bの取付面(裏面)、つまり配線基板3との間に所定の隙間が確保されるようになっている。また、この形態では、不用意な外れを防ぐため、ネジ28をネジ孔21aに螺入することにより、保持部19内に保持された固体撮像素子1がそのネジ28によっても抜け止めされるようにしている。但し、このネジ止めは不可欠ではなく、あくまでも補助的な固定力を得るもので、例えば、ネジ28に代えて保持部19とケース5との間に接着剤を流して接合するようにしたもよいものである。

【0015】以上のように構成された電子撮像装置では、被写体が各レンズ体10、11、12及びフィルタ13を通して固体撮像素子1側の光電変換部4の撮像面上に結像され、これが光電変換と電荷蓄積を続けて、電荷蓄積部及び転送部から端子7を介して基板側配線回路へ電気信号として出力される。この点は従来と同じであるが、この構成では配線基板3側にレンズ組立体2用のネジ孔を設ける必要がなくなる。これにより、この電子撮像装置においては、従来構造に対し前記ネジ孔を省略できることに起因し、基板表裏面に設けられる回路配線の制約をなくすることができ、その結果、基板構成のより高密度化及び小型化が比較的容易に達成される。また、レンズ組立体2の取り付け作業は、固体撮像素子2に対してなされ、配線基板3に関係なく行えるため、例えば、配線基板3に対し固体撮像素子2を取り付けた後であっても、配線基板3の表面側から行えるため作業効率を向上できる。

【0016】図4は前記形態例を変形した電子撮像装置

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を図2(a)と同様な断面で示している。同図の電子撮像装置において、図1から図3と同様な部位には同じ符号を付して重複した説明を省略し、異なる構成のみ詳述する。図4の電子撮像装置は、レンズ組立体2が単一のレンズ30の場合の構成例であり、マウント18の後側18B、爪部20付きの保持部19、固体撮像素子1自体は上記した形態例と実質的に同じくしている。すなわち、このレンズ組立体2は、レンズ30がホルダー31等を用いて鏡筒37内に組み付けられている。この場合、鏡筒37は内側に設けられた凹状部37aを有している。そして、レンズ30は、凹状部37aに対し配置された後、熱カシメ部32で固定されるリング状のホルダー31を介して保持される構成である。符号33は、鏡筒37がマウント18の前側18A内に組み込まれるときに使用されるスリ割である。このように、本発明は、請求項に記載した技術要素以外については上記各形態をベースにして種々変更することができるものである。

【0017】

【発明の効果】以上説明したとおり、本発明の電子撮像装置にあっては、従来の如く配線基板側に専用のネジ孔を設ける必要がなくなり、それに対応して基板表裏面に設けられる回路配線の制約をなくし、基板の高密度化及び小型化を図ることができる。また、レンズ組立体の取り付け作業は、配線基板に関係なく行うことができ、例えば、配線基板に対し固体撮像素子を取り付けた後であっても、配線基板の表面側から行えることから、作業性が良好になり、位置決め機構等を大幅に簡易化できる。

【図面の簡単な説明】

【図1】本発明形態例について、レンズ組立体と固体撮像素子との関係を示す概略斜視図である。

【図2】図3のA-A線とB-B線に沿う断面図である。

【図3】本発明形態例の電子撮像装置をレンズ組立体と固体撮像素子との組立状態で固体撮像素子側から見たときの背面図である。

【図4】本発明を適用した他の電子撮像装置例を示す断面図である。

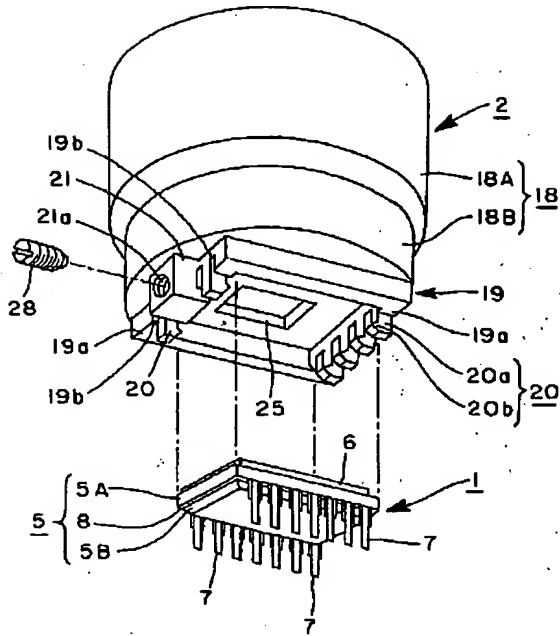
【図5】従来の電子撮像装置を示す断面図である。

【符号の説明】

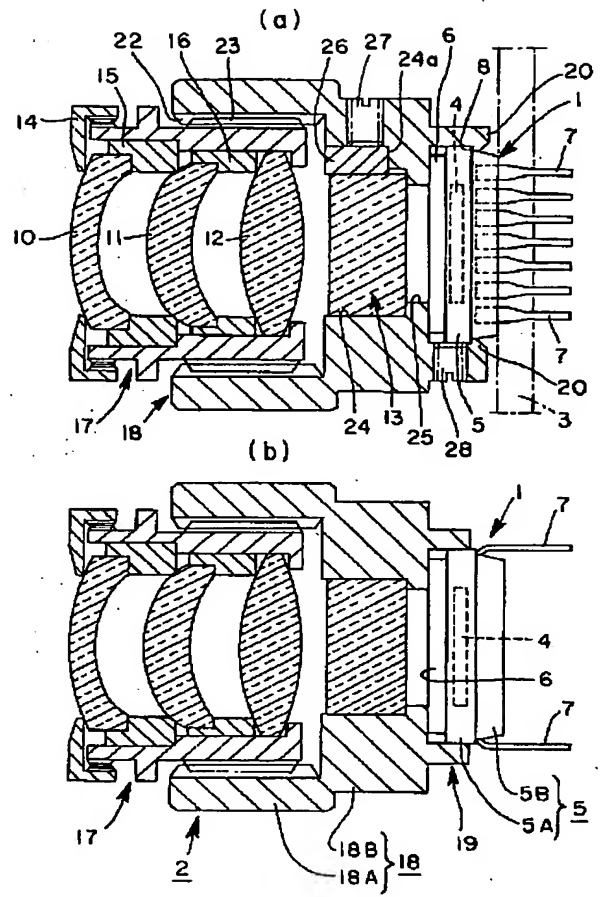
1は固体撮像素子、2はレンズ組立体、3は配線基板、5はケース
7は端子、8は係止部、18はマウント、19は保持部
19aは枠状保持部を構成している対向板部分、19bはスリット
20は爪部、21aはネジ孔、28はネジ

(5)

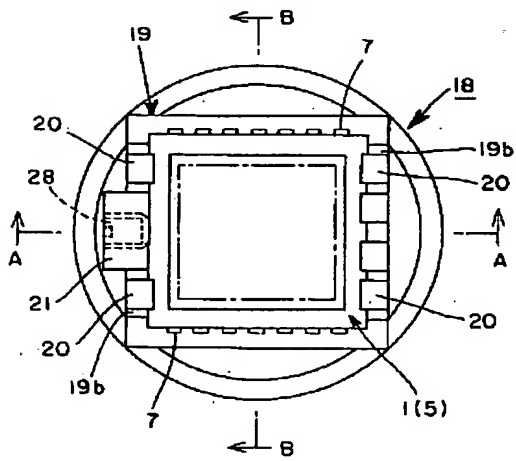
【図1】



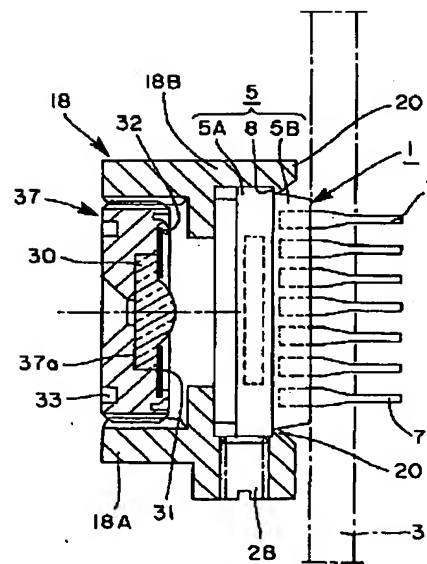
【図2】



【図3】



【図4】



(6)

【図5】

